Patent Claims

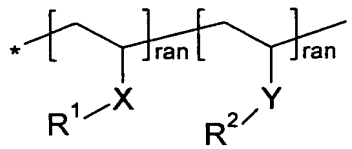
1. Use of statistical copolymers containing at least one structural unit containing hydrophobic radicals and at least one structural unit containing hydrophilic radicals as emulsifier.

2. Use according to Claim 1, characterised in that the copolymers are used as emulsifier in the synthesis of nanoparticles from emulsions.

3. Use according to at least one of the preceding claims, characterised in that the weight ratio of structural units containing hydrophobic radicals to structural units containing hydrophilic radicals in the statistical, copolymers is in the range from 1:2 to 500:1, preferably in the range from 1:1 to 100:1 and particularly preferably in the range from 7:3 to 10:1.

4. Use according to at least one of the preceding claims, characterised in that the weight average molecular weight of the statistical copolymers is in the range from M_w = 1000 to 1,000,000 g/mol, preferably in the range from 1500 to 100,000 g/mol and particularly preferably in the range from 2000 to 40,000 g/mol.

5. Use according to at least one of the preceding claims, characterised in that the copolymers conform to the formula I



I

where

X and Y correspond to the radicals of conventional nonionic or ionic monomers, and

R^1 stands for hydrogen or a hydrophobic side group, preferably selected from branched or unbranched alkyl radicals having at least 4 carbon atoms, in which one or more, preferably all, H atoms may have been replaced by fluorine atoms, and

R^2 stands for a hydrophilic side group, which preferably has a phosphonate, sulfonate, polyol or polyether radical,

and where -X-R^1 and -Y-R^2 may each have a plurality of different meanings within a molecule.

6. Use according to Claim 5, characterised in that X and Y, independently of one another, stand for -O-, -C(=O)-O-, -C(=O)-NH-, -$(CH_2)_n$-, phenylene or pyridyl.

7. Use according to at least one of the preceding claims, characterised in that at least one structural unit contains at least one quaternary nitrogen atom, where R^2 preferably stands for a -$(CH_2)_m$-$(N^+(CH_3)_2)$-$(CH_2)_n$-SO_3^- side group or a -$(CH_2)_m$-$(N^+(CH_3)_2)$-$(CH_2)_n$-PO_3^{2-} side group, where m stands for an integer from the range from 1 to 30, preferably from the range from 1 to 6, particularly preferably 2, and n stands for an integer from the range from 1 to 30, preferably from the range from 1 to 8, particularly preferably 3.

8. Use according to at least one of the preceding claims, characterised in that at least one structural unit is an oligomer or polymer, preferably a macromonomer, where polyethers, polyolefins and polyacrylates are particularly preferred as macromonomers.

9. Process for the production of polymer-modified nanoparticles, characterised in that, in a step a), an inverse emulsion comprising one or more water-soluble precursors of the nanoparticles or a melt is prepared with the aid of a statistical copolymer of at least one monomer containing hydrophobic radicals and at least one monomer

containing hydrophilic radicals, and, in a step b), particles are produced.

10. Process according to Claim 9, characterised in that particles are produced in step b) by reaction of the precursors or by cooling of the melt.

11. Process according to Claim 10, characterised in that the precursors are reacted with an acid, a lye, a reducing agent or an oxidant.

12. Process according to Claim 11, characterised in that a sodium silicate as precursor is reacted with an acid or lye to give silicon dioxide.

13. Process according to Claim 11, characterised in that a soluble compound of a noble metal, preferably silver nitrate, is reacted with a reducing agent, preferably citric acid, to give the metal.

14. Process according to Claim 11, characterised in that a soluble metal compound, preferably a soluble Pb, Cd or Zn compound, is reacted with hydrogen sulfide to give the metal sulfide.

15. Process according to Claim 11, characterised in that a soluble metal compound, preferably calcium chloride, is reacted with carbon dioxide to give a metal carbonate.

16. Process according to at least one of the preceding claims, characterised in that the droplet size in the emulsion is in the range from 5 to 500 nm, preferably in the range from 10 to 200 nm.

17. Process according to at least one of the preceding claims, characterised in that a second emulsion in which a reactant for the precursors

is in emulsified form is mixed in step b) with the precursor emulsion from step a).

18. Process according to Claim 17, characterised in that the two emulsions are mixed with one another by the action of ultrasound.

19. Process according to at least one of the preceding claims, characterised in that the one or more precursors are selected from water-soluble metal compounds, preferably silicon, cerium, cobalt, chromium, nickel, zinc, titanium, iron, yttrium or zirconium compounds, and the precursors are preferably reacted with an acid or lye.

20. Process according to at least one of the preceding claims, characterised in that a coemulsifier, preferably a nonionic surfactant, is employed.